

FORT RILEY CERCLA
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FFTA 3.4 001

**DRAFT FINAL
ACTION MEMORANDUM**

**EXPOSURE CONTROL ACTION
FOR THE
FORMER FIRE TRAINING AREA
MARSHALL ARMY AIRFIELD
FORT RILEY, KANSAS**

16 March 1998

Prepared for
United States Army Engineer District, Kansas City
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LIST OF ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.
DCE	1,2-Dichloroethylene (total)
EA	Each
EE/CA	Engineering Evaluation / Cost Analysis
FFA	Federal Facility Agreement
FFTA	Former Fire Training Area
GAC	Granular Activated Carbon
gpm	Gallons per minute
IAG	Interagency Agreement
IWSA	Installation Wide Site Assessment
KDHE	Kansas Department of Health and Environment
LF	Linear Foot
MAAF	Marshall Army Airfield
MCL	Maximum Contaminant Level established by EPA under the Safe Drinking Water Act
NCP	National Contingency Plan
O&M	Operations and Maintenance
PCE	Tetrachloroethylene or Perchloroethylene
PE	Polyethylene (pipe)
PVC	Polyvinyl Chloride (pipe)
QCSR	Quality Control Summary Report
RWD	Rural Water District

SDWA Safe Drinking Water Act
SI Site Investigation

TCE Trichloroethylene or Trichloroethene

USEPA United States Environmental Protection Agency

VOC Volatile Organic Compound

mg/l milligrams per liter (approximately equivalent to parts per million)
µg/l micrograms per liter (approximately equivalent to parts per billion)

1.0 PURPOSE

The purpose of this Action Memo is to outline the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) processes followed and to document the Army's decision to implement an exposure control action at the Former Fire Training Area - Marshall Army Airfield (FFTA-MAAF) site, Fort Riley, Kansas. This document also serves as a vehicle to obtain U.S. Environmental Protection Agency (USEPA), Region VII, and Kansas Department of Health and Environment (KDHE) concurrence with the exposure control action.

The Engineering Evaluation/Cost Analysis⁽¹⁻¹⁾ (EE/CA) which is the subject of this Action Memorandum, was conducted to identify and evaluate alternatives to accomplish non-time critical exposure control to eliminate the potential hazard of ingestion of contaminated groundwater. The preferred alternative that the Army intends to implement is replacement of the affected water supply wells at this site with new wells.

2.0 SITE CONDITIONS AND BACKGROUND

2.1 Site Description

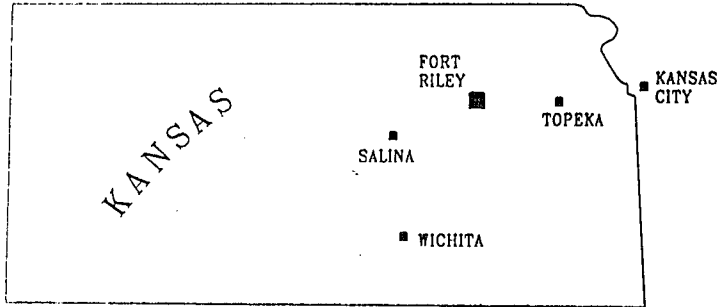
The Fort Riley Military Reservation is located just north of Junction City in northeast Kansas (Figure 2-1). Fort Riley contains 101,058 acres, including portions of Riley, Geary, and Clay Counties. The FFTA-MAAF is located along the northern boundary of Marshall Field, approximately 1,000 feet northeast of the north end of the north-south runway. The Fort Riley installation boundary is located approximately 300 feet north of the former fire training pit. The general FFTA-MAAF site is shown in Figure 2-2.

2.1.1 Removal Site Evaluation

On 14 July 1989, the United States Environmental Protection Agency (EPA) proposed inclusion of Fort Riley on the National Priorities List (NPL), and listed the installation on the NPL in August 1990, pursuant to the CERCLA. The U.S. Department of the Army - Fort Riley, the KDHE and the USEPA entered into a Federal Facility Agreement (FFA) (also referred to as the Interagency Agreement [IAG]) -- Docket No. VII-90-F-0015 to address environmental releases subject to CERCLA. The IAG, which became effective in June 1991, required Fort Riley to conduct a systematic site assessment to identify all potential areas of concern (PAOC) at Fort Riley. The systematic site assessment was performed in 1992 with the results presented in the Installation Wide Site Assessment (IWSA)⁽²⁻¹⁾. The IWSA identified 24 groupings of PAOCs consisting of over 45 individual PAOCs. Investigations and evaluations of an environmental release from the FFTA-MAAF are being conducted to fulfill requirements of the IAG.

An initial Site Investigation⁽²⁻²⁾ (SI) was conducted for FFTA-MAAF during the period of September 1993 through June 1994. The purpose of the SI was to collect data to confirm or deny that hazardous substances are present at the FFTA-MAAF. The results of the SI indicated that petroleum hydrocarbons and chlorinated solvents (including tetrachloroethylene, also known as perchloroethylene (PCE)) were present in the subsurface soil and groundwater environment. Additionally, contaminants similar to those detected at the FFTA were detected in groundwater along the installation boundary and in off-post private wells located at a speedway, approximately 1,000 feet north of the FFTA-MAAF.

Groundwater quality data through August 1996 show that two, off-post, private wells on property immediately downgradient of the FFTA-MAAF have detected concentrations of trichloroethylene (TCE), total 1,2-dichloroethylene (DCE), and PCE above Maximum Contaminant Levels (MCLs). These wells are located at a property used as an automotive racetrack (referred to as the "racetrack property"), and are identified as R-1 and R-2. Well R-1 serves the concession stand at the racetrack and was used intermittently for drinking water when the racetrack is in use, which is typically one or two nights per week for the months of May through September. According to the owners of the



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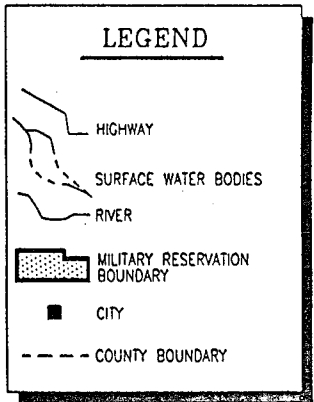
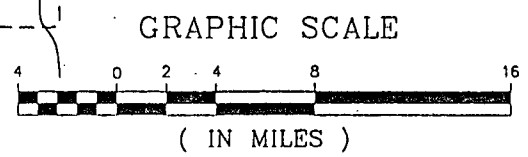
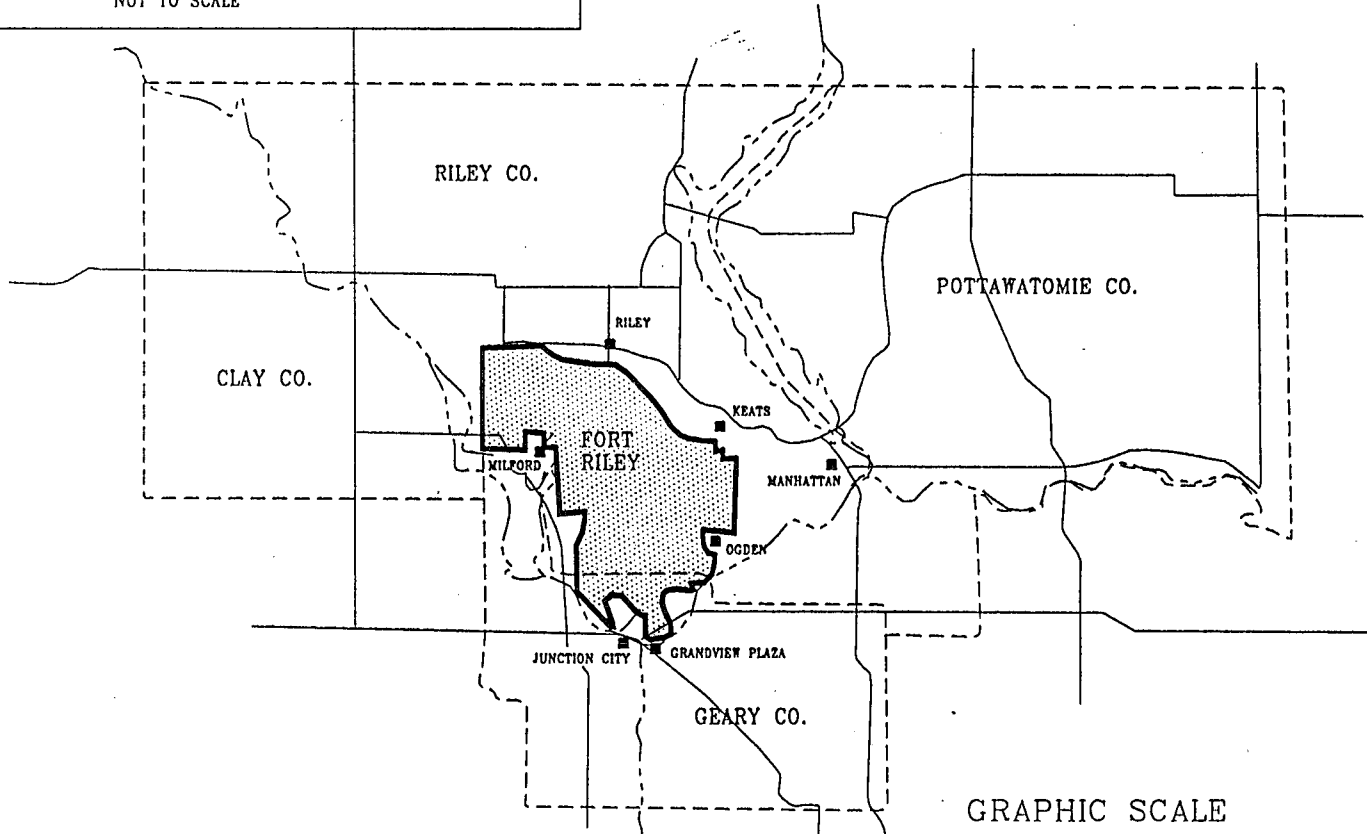
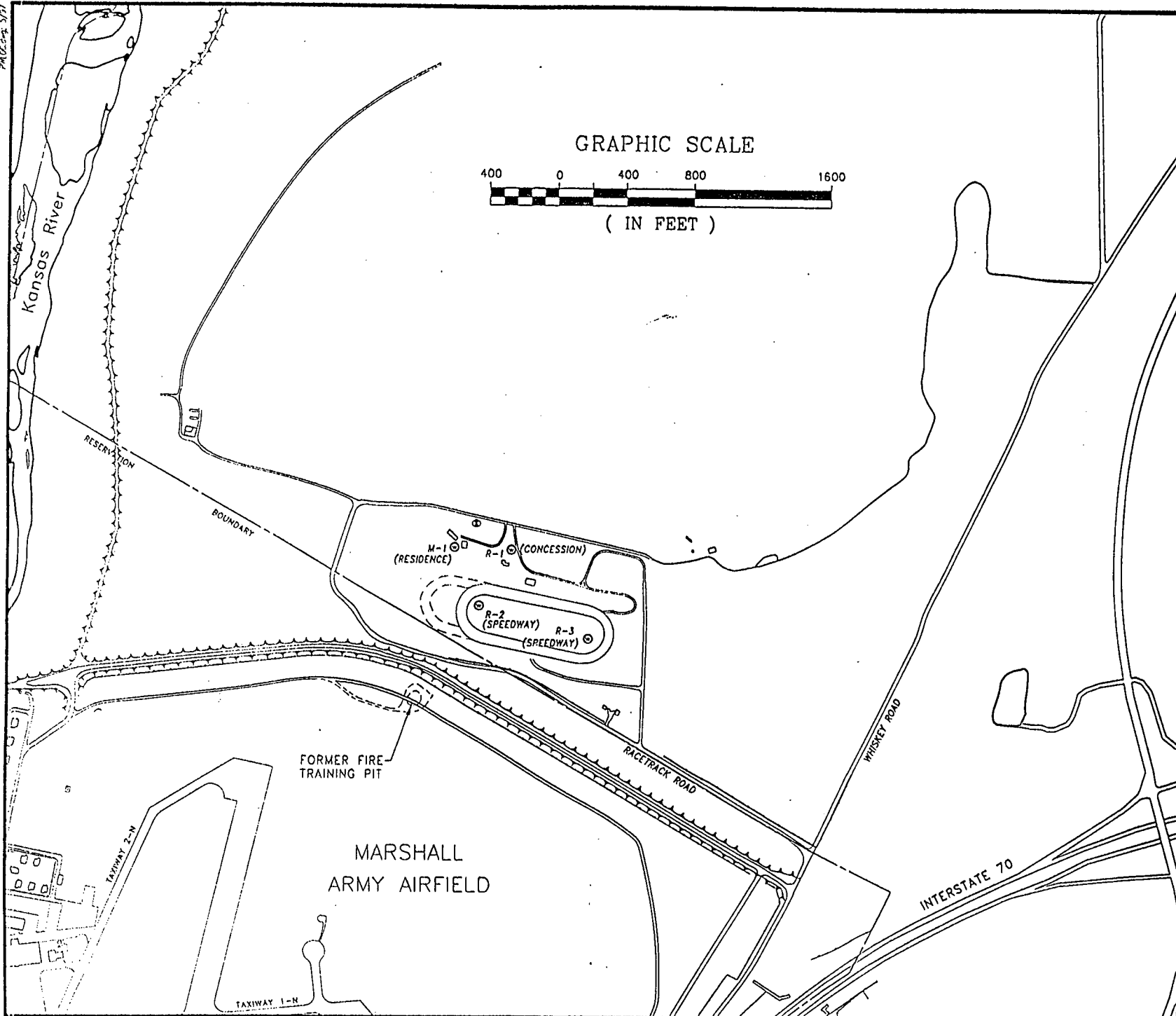


Figure 2-1:
General Location
of Fort Riley,
Kansas

PM100-2-577



LEGEND

- ⊙ PRIVATE WELL
- ==== ROAD
- FORMER FEATURE
- x-x- FENCE LINES
- ~ LEVEE

Figure 2-2:
Location of FFTA-MAAF

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racetrack, water from well R-1 has not been used for drinking since evidence of contamination was found. Well R-2 is located in the center of the racetrack and is used as a source of water for track grooming and dust control. Well R-2 remains in use for that purpose.

Other nearby private wells have also shown contamination: DCE has been detected in well M-1, however, not in concentrations above the MCL.

2.1.2 Physical Location

The area of the former fire training pit is within the boundaries of the airfield and is separated from the properties to the north by a levee and an 8-foot, continuous chain-link fence that surrounds the airfield. The nearest airfield building is over 2,000 feet to the southwest. No fire fighting training has been conducted at the FFTA since 1984. The airfield open areas near FFTA-MAAF are used as cultivated hay meadows (primarily brome grass), with some invasion of species of native prairie hay. In December 1994, a temporary fence was installed around the immediate area of the FFTA in conjunction with a pilot test study of soil remediation technologies. The area inside the fence is not currently used to harvest hay.

Properties to the north are used for both private residences and farming. Private wells are located within approximately one-half mile to the north of the installation boundary at this location. Four properties with a total of eight private wells were initially identified -- two wells at two residences, three wells at the speedway, one at a trailer home adjacent to the speedway, and two on a farm. An irrigation well was placed in service since the time of the initial SI, in the spring of 1994.

The property north of the FFTA-MAAF has been used as an automobile racetrack since the early 1980s. In addition to the two wells in use at the racetrack, there is a well, R-3, located inside the racetrack which is not currently in use. It is noted that contaminants have not been detected in well R-3.

2.1.3 Site Characteristics

The topographic lowlands along the Kansas River are underlain by a substantial thickness of alluvial deposits, consisting predominantly of sands and gravels, with occasional clay and silt layers. The alluvial deposits on Fort Riley are on the order of 100-feet in thickness in the deepest portions of the filled valley channel, and thin out towards the bluffs. All of MAAF is located on alluvial deposits of the Kansas River. The FFTA-MAAF is located along the margin of the thick alluvial deposits. Four monitoring wells have been installed to bedrock in the immediate vicinity of the FFTA-MAAF; depth to bedrock ranged from approximately 60 to 70 feet. Bedrock was described as light gray, soft, weathered limestone with some shale. These borings to bedrock as well as other investigations of the area (including geophysical surveys and cone penetrometer testing) show that layers of silts

and clays in the alluvial materials are relatively thin (on the order of a few feet in thickness) and are discontinuous.

Depth to groundwater at the FFTA and nearby off-post properties varies from approximately 10 to 20 feet beneath the ground surface. Fluctuations in the groundwater elevations occur due to periods of high rainfall and drought; groundwater elevations rose to depths of 8 to 12 feet from the ground surface during the regional flooding in 1993. Measurements of groundwater elevations have been conducted periodically since October 1993.

Groundwater is the primary source of drinking water for Fort Riley and many of the surrounding communities. There is no surface water used for drinking water within 15 miles downstream of the FFTA-MAAF. Alluvial sand and gravel deposits in the lowland areas are excellent aquifers in the area. In the upland areas, limestone formations are tapped as sources of water. Uses of the Kansas River alluvial aquifer and the limestone bedrock aquifers are identified below.

□ Alluvial Aquifer

Fort Riley and the communities of Junction City and Ogden rely on groundwater withdrawn from alluvial materials for their municipal drinking water supplies. Fort Riley has eight active wells, Junction City has nine active wells, and Ogden has three active wells. Ogden also provides water to a rural water district in Riley County.

Morris County Rural Water District (RWD) has three wells located near the mouth of Clark's Creek where it enters the Kansas River. However, these wells were designed to withdraw water from the Clark's Creek alluvial aquifer, and not the Kansas River aquifer⁽²⁻³⁾.

Private wells were identified on the properties downgradient of the FFTA-MAAF as follows:

- ▶ Three groundwater wells are located at the speedway (Figure 2-3), one northwest of the track near the grandstands (R-1), and two located at each end of the track (R-2 to the west and R-3 to the east). The water from wells R-2 and R-3 is used for dust control and vehicle washing and is not used for consumption. R-3 is not currently in use and has not been used for years. The water from well R-1 was formerly used to supply the concession stand and may have been used for washing and drinking.
- ▶ One residential drinking water well was identified immediately north of the racetrack: M-1 serves a machine shop and a house trailer.
- ▶ Other private wells serving residences (F-1, F-2, N-1) and one irrigation well (I-1) were also identified north of the racetrack. Testing of these wells during the SI indicated that they are not contaminated and, thus, are not addressed in the EE/CA.

□ Bedrock Aquifer

Private residences in the upland areas, outside of town limits, use private wells. Some of these residences have access to water provided by rural water districts. Many of the rural residences surrounding Fort Riley are located in the uplands area, and their wells tap bedrock formations. In general, the limestone formations are sufficiently transmissive to yield reliable groundwater supplies. However, given the interbedded nature of the uplands area, many of the wells will be drawing water from different limestone horizons.

2.1.4 Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The FFTA-MAAF was operated from the mid-1960s through 1984 to conduct fire training exercises. During the period of use, the site consisted of a pit (crushed stone pad inside a perimeter berm approximately 200-feet by 200-feet) with no subsurface liner.

During use, flammable liquids were dumped into the pit, ignited, then extinguished during fire training exercises. The predominant materials used for the fire training exercises were petroleum hydrocarbons, including JP-4, diesel, MOGAS (a generic term for motor gasoline often used to refer to gasolines with lead alkyls) and gasoline. Some flammable liquids were stored at the site in drums until the next training exercise was conducted. Aerial photographs from 1977 and 1984 indicate that these drums were stored to the immediate east and southeast of the bermed fire pit.

In August 1982, 55 gallons of PCE were inadvertently poured into the fire training pit. The next day it was pumped out of the pit prior to ignition, and hay was spread over the remaining liquid.

The potential for groundwater contamination as a result of releases from the FFTA was evaluated by installing and sampling groundwater monitoring wells located in the vicinity of the FFTA. In addition, groundwater samples were collected and analyzed from nine private wells located in the areas downgradient of the FFTA. The number of monitor wells has increased since the initial SI in September 1993. At that time, seven monitor wells were installed and sampled. As of August 1996, 25 monitor wells were installed and sampled. The locations of all of the monitor wells sampled are shown in Figure 2-3, including four private wells (F-1, M-1, R-1, R-2) immediately downgradient of the FFTA-MAAF. During each round of sampling, groundwater was analyzed for the following parameters:

- Volatile organic compounds (VOCs) using USEPA Methods 8240 and 8260;
- Semi-volatile organic compounds using USEPA Method 8270;

- Total petroleum hydrocarbons (both gasoline and diesel fractions) using USEPA Method 8015 modified; and
- Priority pollutant metals using USEPA Methods 6010 and 7000 Series.

Since June 1994, additional investigations and periodic groundwater monitoring have been conducted as an expansion to the SI. An overview of the key findings of these investigations are as follows:

- The FFTA-MAAF overlies an alluvial aquifer consisting predominantly of sand and gravel; the alluvial materials are underlain by bedrock at depths of approximately 60 to 70 feet beneath the ground surface in the area of the site.
- Depth to groundwater is approximately 10 to 20 feet beneath the ground surface; groundwater fluctuations of up to 8 feet have been observed due to high rainfalls and flooding.
- Direction of groundwater flow is predominantly to the north, with seasonal fluctuations due to changing hydrologic conditions to both the northeast and northwest.
- Groundwater monitor wells screened in the shallow alluvial materials (the upper 15 feet of the aquifer) and shallow private wells (screened intervals overlap with upper 15 feet of aquifer) have shown detections of DCE, TCE and PCE both in groundwater directly underlying the FFTA-MAAF and in wells up to 1,200 feet downgradient of the FFTA-MAAF.
- Detections of TCE and PCE in two private wells (R-1, R-2) have exceeded the MCLs.
- Concentrations of DCE, TCE and PCE in groundwater have consistently been present in the private wells (R-1, R-2) downgradient of the FFTA-MAAF since October 1994.

Additional groundwater investigations have been conducted using field screening techniques. The results of the field screening techniques were used to guide the location and placement of monitor wells. Since monitor wells are currently located throughout the areas in which field screening of groundwater was conducted, the results of the groundwater sampling from the monitor wells will be used to summarize contamination at the site. The findings from the sampling of the monitor wells are consistent with the findings of the groundwater screening with respect to both magnitude of contamination as well as horizontal and vertical extent.

The positive detections in groundwater from October 1993 through August 1996 sampling are presented in Table 2-1⁽²⁻⁴⁾. The detected concentrations are compared against the MCLs established by USEPA under the Safe Drinking Water Act. Concentrations that exceed MCLs identify water

that is not considered suitable for drinking. The data show that the primary contaminants in shallow groundwater are DCE, TCE and PCE. Groundwater data indicate that three private wells downgradient of the FFTA contain detectable concentrations of DCE (R-1, R-2, M-1), and two private wells contain concentrations above the MCLs of TCE and PCE (R-1, R-2). These wells are used as follows:

- R-1 - Supplies the racetrack concession stand, which is an enclosed building - previously used for washing and potential drinking water uses. The racetrack concession stand is used intermittently; maximum use occurs one or two nights a weekend during the months of May through September. The owner has been advised by KDHE not to use R-1 for human consumption.
- R-2 - Supplies water to a spigot that is approximately 15 feet off the ground surface. The supply is used by workers to fill water tankers and apply water to the track for grooming and to control dust. No other uses of the water are known or reported.
- M-1 - Supplies water to a machine shop and trailer home. The water is used for domestic purposes, including drinking, bathing, and sanitary sewer. The machine shop is currently active during the days, and the trailer home is currently occupied.

These data demonstrate that the detections of DCE, TCE and/or PCE in wells M-1, R-1 and R-2 represent actual contamination of drinking water supplies and/or result in actual or potential exposures of humans to hazardous substances. These conditions meet the National Contingency Plan (NCP) requirements for conducting a removal action. Therefore, the EE/CA evaluates alternatives for prevention, abatement and/or mitigation of these potential or actual exposures.

2.1.5 NPL Status

The NCP identifies the following conditions that indicate that an exposure control action is warranted (Section 300.415(b)(2)(i)-(viii)):

- Prevention or abatement of actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants; and
- Prevention or abatement of actual or potential contamination of drinking water supplies or sensitive ecosystems.

The mitigation and/or control of exposures to contaminated groundwater in private wells downgradient of the FFTA-MAAF meets the criteria for an exposure control action, as defined in the NCP. The exposure control action is considered a non-time critical removal action because there are currently no uses of groundwater with concentrations above MCLs for drinking water. Use of

R-1 has been discontinued, R-2 is used for racetrack maintenance and is not intended for drinking water, and the concentrations in M-1 are not above MCLs.

2.2 Other Actions

2.2.1 Previous Actions

Fort Riley has offered bottled drinking water to the potentially impacted well users to address immediate endangerment.

2.2.2 Current Actions

There are no current removal actions being conducted at the site for purposes of preventing or abating exposures to users of groundwater downgradient of the FFTA.

2.3 State and Local Authorities' Roles

2.3.1 State and Local Actions to Date

Geary County has denied permits for use of R-1 and R-2 for public consumption, due to contamination in the area. No other response has been taken at the state or local level and none are anticipated.

2.3.2 Potential for Continued State/local Response

Geary County will have continued involvement regarding permitting of wells for public consumption use at the site.

3.0 THREATS TO PUBLIC OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The overall objective of the removal action is to provide exposure control for contaminated groundwater in private wells downgradient of the FFTA-MAAF. The cleanup of contaminated groundwater will require a long-term remedial action, which is currently being assessed by Fort Riley under a CERCLA remedial investigation/feasibility study. Therefore, cleanup of contaminated groundwater is not an objective of this exposure control action. Rather, the exposure control action will focus on the point-of-use exposure and alternatives for preventing or controlling the exposures that occur through use of contaminated wells.

There are three private wells which contain hazardous substances that could result in actual or potential, harmful exposures. These are M-1, R-1 and R-2. Over approximately a three-year period from October 1993 through August 1996, the area of contamination has remained similar. Therefore, additional migration to other wells within the time frame required to implement this exposure control action is not anticipated. The next nearest private well downgradient of the area of contamination is I-1, which is used for irrigation of crops. Therefore, there is a potential for harmful exposures to humans should I-1 become contaminated in the future. I-1 is being sampled on a periodic basis (approximately three times a year) to evaluate future impacts to this well. The next nearest downgradient drinking water wells are the Morris County RWD wells, located approximately two miles to the northeast from the downgradient edge of the detected contamination. The Morris County wells, however, are located in the Clark's Creek alluvial aquifer and would not be potentially impacted by contaminants in the Kansas River alluvial valley. Also, in the past three years, there has been no evidence of residential development in the area downgradient of the FFTA-MAAF, and the presence of new users of groundwater in this area in the near future is not anticipated.

Based on these data, the scope of the EE/CA is to evaluate exposure control alternatives for users of wells M-1, R-1 and R-2. The exposure control alternatives have been selected based on their ability to prevent harmful exposures to humans based on the following exposure scenarios: water used for drinking and other ingestion (cooking); water used for bathing and washing; and inhalation of vapors emitted from water.

There are no documented threats to the environment from the subject release in terms of exposure to hazardous contamination by animals, the food chain, vulnerable or sensitive populations or habitats, or the ecosystem at the site.

4.0. ENDANGERMENT DETERMINATION

Immediate endangerment has been previously addressed by Fort Riley offering bottled drinking water to the impacted and potentially impacted users. If the exposure control is not implemented, the continuing endangerment condition will have to be addressed by on-going provision of bottled water. There are no other endangerment conditions. Based on the assessment that potential risks at the site are within USEPA acceptable values and can be managed, this exposure control action is considered non-time critical.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

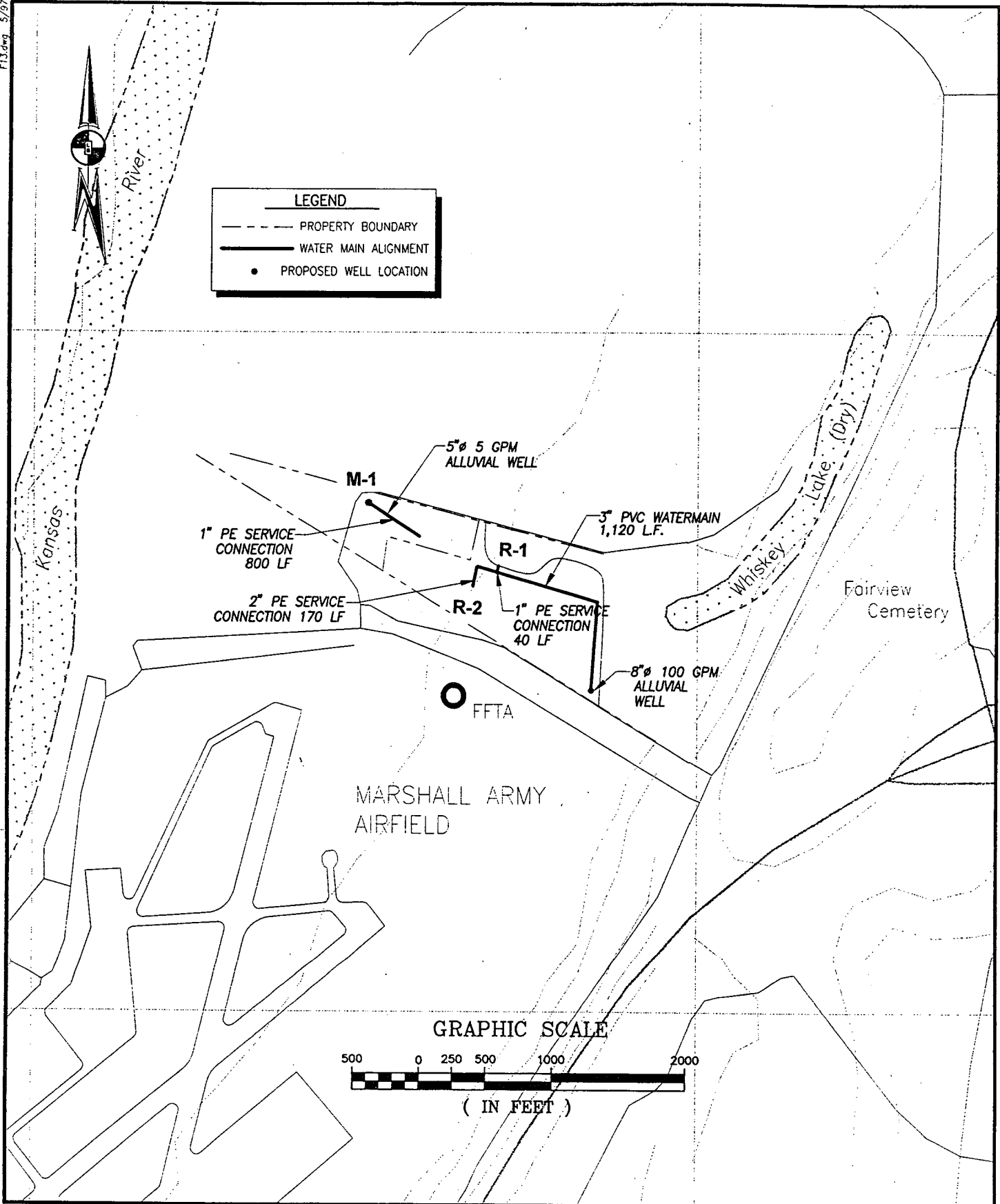
5.1 Proposed Action

5.1.1 Proposed Action Description

The recommended exposure control alternative is the installation of a new well on the property in question to serve both users of wells R-1 and R-2 (Figure 5-1), and a new well to replace well M-1. The new wells will provide exposure control by obtaining water supply from the alluvial aquifer at a distance calculated to be outside of any future plume influence. This alternative has a minor drawback in effectiveness due to the remote possibility for future contamination, although hydrogeological analyses indicate that the contamination will not at any time in the future impact the proposed cones of influence of the new wells. Aquifer testing will be performed in the new wells prior to their use for drinking water, to allow for specific analyses of hydrogeologic conditions and verification that exposure control will be achieved. All other implementation considerations presented in the following sections indicate that this alternative is the best available at the site.

The recommended alternative is not the least costly option, but is the most implementable and effective alternative in terms of meeting Fort Riley's goals of providing a clean, safe supply of water with a minimum need for future attention by Fort Riley in terms of operations and maintenance resources. The least costly alternative included provision of wellhead treatment units for each existing well, which is not considered as implementable based on the ongoing future need for operation and maintenance by Fort Riley. In addition, the recommended alternative gives the off-post water users freedom to operate the well(s) without continued post-exposure site control by Fort Riley.

Implementation includes the development of and compliance with a construction Health and Safety Plan to include provisions for worker protection, as well as proper handling and disposal of contaminated materials that may be encountered. The primary potential exposure may be the abandonment of the existing wells.

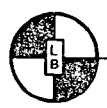


LEGEND

- PROPERTY BOUNDARY
- WATER MAIN ALIGNMENT
- PROPOSED WELL LOCATION

EXPOSURE CONTROL EE/CA
FFTA - MAAF, Ft. Riley, KS

Figure 5-1:
NEW M-1, NEW R-1/R-2
COMMON WELL CONCEPTUAL
ALTERNATIVE



LOUIS BERGER & ASSOCIATES, INC.
295 Promenade Street, Providence, RI 02908

Scale: As Shown

28 FEBRUARY 1998

The total construction cost of the recommended alternative is estimated to be approximately \$142,200, as shown in Table 5-1.

5.1.2 Contribution to Remedial Performance

The selected alternative for exposure control at the site provides alternate water supply sources for affected property owners. The exposure control action will be effective regardless of the performance of other remedial actions taken at the site, and will not affect the performance of remedial actions in any way.

5.1.3 Description of Alternative Technologies

The following alternative technologies were formulated and evaluated in the EE/CA⁽¹⁻¹⁾:

□ Extend Public Water Supply Systems

This alternative involves extension of a public water supply system to the site. Extensions of water mains were evaluated from the Ft. Riley/MAAF system, and the Morris County RWD.

□ Install New Well for M-1, and New Common Well for R-1 and R-2, On Site

This alternative consists of providing new groundwater well supplies on the subject properties in a manner that would remove potential exposure to contaminants. Wells R-1 and R-2 would be replaced with a new 8-inch well serving both uses, located in the southeast corner of the subject property. Well M-1 would be replaced with a 5-inch alluvial aquifer well approximately 800 feet to the west of the existing well.

□ Perform Wellhead Treatment at Existing Wells

This alternative includes the continued use of the existing wells, with provision of wellhead treatment or tap treatment prior to use of the water. Treatment would be targeted for removal of VOCs.

The above alternatives were analyzed for their effectiveness, implementability, and cost in achieving exposure control at the site. The following conclusions summarize the results of the comparative analysis of alternatives:

- The alternatives that utilize extension of a public water supply system to achieve exposure control are fully effective, remove all potential for exposure, yet are the most costly. These alternatives are technically implementable and are acceptable from a regulatory standpoint. However, the responsibility for future operations and maintenance would require negotiation with the affected property owners and water districts, and Fort Riley would potentially have

continued involvement. Finally, the costs to implement these alternatives varied proportionally with length of the extension, with the extension from the Fort Riley system being the least costly of the two public water supply system alternatives.

- The alternative involving construction of new wells is considered to be effective, with a very remote future potential for migration of the contaminants into the wells' cones of influence. This potential will be further minimized by completion of aquifer testing in the new wells prior to use, to verify based on hydrogeologic analyses the effectiveness of the proposed wells. This alternative is technically implementable and acceptable from a regulatory standpoint. The replacement of affected wells with new ones on existing properties, operated by property owners as in-kind systems with no future need for Fort Riley involvement, is the preferred alternative. These alternatives are relatively cost-effective compared to other feasible options.
- The provision of wellhead treatment of the existing well sources is considered to be moderately effective, since any mechanical treatment system can experience periods of malfunction during which time exposure control would be compromised. The preferred treatment option of granular activated carbon (GAC) adsorption is technically implementable and acceptable from a regulatory standpoint. However, Fort Riley would have continued responsibility for operation and maintenance (O&M) of these systems, which could be a significant effort. Due to the relatively high amount of O&M required, this alternative is considered to be less implementable than other options.

5.1.4 Engineering Evaluation/Cost Analysis

There were no public comments received on the EE/CA.

5.1.5 Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs determined to be potentially applicable to the exposure control action include:

- Kansas Water Well Contractor's License (well construction and abandonment): regulates the construction, treatment, and plugging of water wells in State of Kansas aquifers, including contractor licensing and per well fee requirements. "Aquifer" is defined in the regulation as an underground formation that contains and is capable of transmitting groundwater. This regulation is potentially applicable to the extent that existing wells are abandoned and/or new wells are installed.
- Geary County Health Department: regulates the use of water supplies for public consumption.

5.1.6 Project Schedule

The exposure control action is scheduled for implementation during the spring of 1998.

5.2 Estimated Costs

Fort Riley would be responsible for the construction of the selected alternative to provide replacement wells, although not for the costs of operating the wells since those will be the same as currently incurred by the well users. The estimated design and construction cost for this alternative is approximately \$142,200. Annual costs associated with this alternative, and Fort Riley's responsibility, are estimated to be \$2,000 for groundwater quality monitoring in the new wells to verify the effectiveness of the exposure control. The estimated project costs are summarized in Table 5-1.

Table 5-1
Replace R-1 and R-2 with Common Well; Replace Well M-1

ITEM	DESCRIPTION	ESTIMATED			CONSTRUCTION COST	O&M
		UNIT	QUANTITY	UNIT COST (\$)		
A	GROUNDWATER WELLS					
1	Complete well installation - 8-inch	EA	1	\$ 7,500	\$ 7,500	
2	Complete well installation - 5inch	EA	1	\$ 5,000	\$ 5,000	
3	Residential service connections, 1-inch PE pipe, in place	EA	2	\$ 650	\$ 1,300	
4	Commercial service connections, 2-inch PE pipe, in place	EA	1	\$ 1,000	\$ 1,000	
5	Pipe, 1-inch, PE, in place	LF	840	\$ 15	\$ 12,600	
6	Pipe, 2-inch, PE, in place	LF	170	\$ 16	\$ 2,720	
7	Pipe, 3-inch, Schedule 80 PVC, in place	LF	1,600	\$ 27	\$ 43,232	
8	2-inch backflow preventor (R-2)	EA	1	\$ 480	\$ 480	
9	Pump Test	LS	2	\$ 10,000	\$ 20,000	
B	SURFACE RESTORATION					
1	Abandon existing well	EA	3	\$ 1,000	\$ 3,000	
C	ELECTRICAL SERVICE					
1	Electrical service connection	LF	845	\$ 10	\$ 8,450	
D				SUBTOTAL	\$ 105,282	
E	CONSTRUCTION CONTINGENCY	20%			\$ 21,056	
F				CONSTRUCTION SUBTOTAL	\$ 126,338	
G	ENGINEERING / CONSTRUCTION INSPECTION	10%			\$ 10,528	
H	ADMINISTRATION / LEGAL	5%			\$ 5,264	
I				CONSTRUCTION TOTAL	\$ 142,131	
J	ANNUAL OPERATIONS AND MAINTENANCE					\$ 2,000
K	PRESENT WORTH (O&M): 30 years	7%				\$ 24,818
L				PROJECT TOTAL PRESENT WORTH	\$ 166,949	

Source: Louis Berger & Associates, Inc., 1998

- NOTES: 1. O&M includes quarterly water quality monitoring
2. No additional O&M for well operation has been added (costs assumed same as existing for well users)
3. EA = Each
LF = Linear Foot
PE = Polyethylene
PVC = Polyvinyl Chloride

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

A delay in the action, or implementation of the no-action alternative, would result in a situation in which the existing individual water supply wells would remain in use for each user, with no change in water quality or exposure control from existing and future levels of groundwater contamination at the site. The current endangerment conditions would prevail, requiring continued provision of bottled water supply to the affected properties.

7.0 OUTSTANDING POLICY ISSUES

No outstanding policy issues are anticipated with the implementation of the findings of the subject exposure control EE/CA.

8.0 ENFORCEMENT

Investigations and evaluations of the environmental release from the FFTA-MAAF are being conducted to fulfill requirements of the Interagency Agreement between the U.S. Department of the Army (Fort Riley), the KDHE and the USEPA. Fort Riley can and will perform the proposed response promptly and properly.

9.0 RECOMMENDATION

The preferred alternative that the Army intends to implement, in order to eliminate the potential hazard of ingestion of contaminated groundwater at the FFTA-MAAF site, is replacement of the affected water supply wells with new wells.

This decision document represents the selected exposure control action for the FFTA-MAAF site, located north of Junction City in Geary County, Kansas. The document is developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP section 300.415(b)(2) criteria for exposure control, and approval of the proposed exposure control action is requested. The total project ceiling if approved is estimated to be \$165,000.

**LEAD AND SUPPORT AGENCY ACCEPTANCE
OF THE ACTION MEMORANDUM
EXPOSURE CONTROL ACTION FOR THE
FORMER FIRE TRAINING AREA
MARSHALL ARMY AIRFIELD
FT. RILEY, KANSAS**

Signature Sheet for Action Memorandum, Exposure Control Action for the FFTA-MAAF, Fort Riley, Kansas.

Colonel Kent D. Thomas
Garrison Commander, Fort Riley
United States Department of the Army

Date

Dennis Grams, P.E.
Regional Administrator
U.S. Environmental Protection Agency - Region VII

Date

Gary R. Mitchell
Secretary
Kansas Department of Health and Environment

Date

10.0 REFERENCES

- 1-1. *Draft Final Exposure Control Action Engineering Evaluation/Cost Analysis For The Former Fire Training Area Marshall Army Airfield, Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, December 1997.
- 2-1. *Installation Wide Site Assessment for Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 7 December 1992, as revised 16 February 1993.
- 2-2. *Draft Site Investigation For Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas, and Nearby Off-Post Properties*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 1 August 1995.
- 2-3. Memorandum To File: Morris County Rural Water District, Prepared by Louis Berger & Associates, Inc. for U.S. Army Corps of Engineers, Northwest Division, Kansas City District, 27 February, 1998.
- 2-4. *Data Summary Report for the Expanded Site Investigation Former Fire Training Area Marshall Army Airfield, Fort Riley, Kansas*, Prepared by Louis Berger & Associates, Inc., for U.S. Army Corps of Engineers, Missouri River Division, Kansas City District, 6 June 1997.

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Colonel Kent D. Thomas
Garrison Commander, Fort Riley
United States Department of the Army

22 April 1998

Date